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# OnGuard & XProtect Architecture and Design

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## General Description

This document contains the current best practices for designing integrated OnGuard and XProtect systems. Please contact LenelS2 or Milestone engineering teams for help with your project's design.

## Software Version Compatibility & Documentation

Please refer to the compatibility matrix documents and user guides available at the following links:

(OpenVideo) – <https://download.milestonesys.com/lenels2/>

(XProtect Access) – <https://download.milestonesys.com/lenels2xpa/>

## Rules of Design

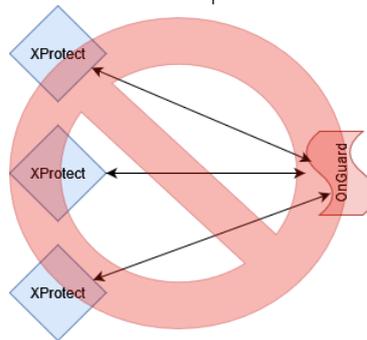
Documented performance thresholds and corresponding design recommendations:

Technology System	Single Server	Total System Size	Total Servers
<b>XProtect (VMS)</b>	100 Cameras/NVR.	5,000 Cameras per Management Server.	100 NVRs per Management Server.
<b>OnGuard (OpenVideo)</b>	1.5 GB memory per LS Communication Server.	LS Communication Server memory is directly proportional to total size of connected XProtect system. Not just integrated cameras and Recording Servers. 15 Recording Servers & 900 total cameras per LS Communication Server connection.	No limit - It is possible to have multiple LS Communication Servers in the same OnGuard system.
<b>XProtect (Access)</b>	100 Events/sec sustained & 300 Events/sec peak.	1x XProtect Access to OpenAccess connection per XProtect Management Server.	No limit – Milestone Federated Architecture or Interconnect allow XProtect to scale, and regionalized architecture allow OnGuard to scale.
<b>OnGuard (OpenAccess)</b>	1x OpenAccess connection per OnGuard Application Server.	1x XProtect Access integration per OnGuard Application Server.	No limit - Regionalized architecture allows unlimited scalability.
<b>XProtect (OpenVideo)</b>	70% CPU utilization on Management Server.	15 Recording Servers & 900 cameras per Management Server to LS Communication Server connection.	No limit – Add LS Communication Servers & Management Servers to scale the system.

*\* These thresholds are only suggestions related to the XProtect Access and OpenVideo integrations which may contradict other documented information from Milestone and OnGuard. It is highly recommended to contact your Milestone and OnGuard engineering team to calculate actual system performance.*

## XProtect Access – performance thresholds

- 1- 100 cameras or less per Recording Server.
  - 5000 cameras per XProtect Management Server.
- 2- 100 events per second on the XProtect Event Server.
  - Peaks up to 300 events per second.
- 3- One OpenAccess to a single XProtect Access connection.
- 4- One XProtect Access connection to one OnGuard OpenAccess server.



Scaling beyond this limit only becomes possible by adding individual one-to-one connections with a regionalized OnGuard. Multiple concurrent connections to OpenAccess can lead to resource competition, performance degradation, and system failure.

## OpenVideo – performance thresholds

- 1- 60 cameras or less per Recording Server.
  - 900 cameras per XProtect Management Server
- 2- Configure the first XProtect to LS Communication Server connection. Monitor the performance.
  - Limit memory to 1.5 GB on LS Communication Server.
  - 15 Recording Servers per LS Communication Server.
  - 900 cameras total per LS Communication Server.
- 3- Memory use on the LS Communication Server is related to overall configuration size of the attached XProtect Management Server.

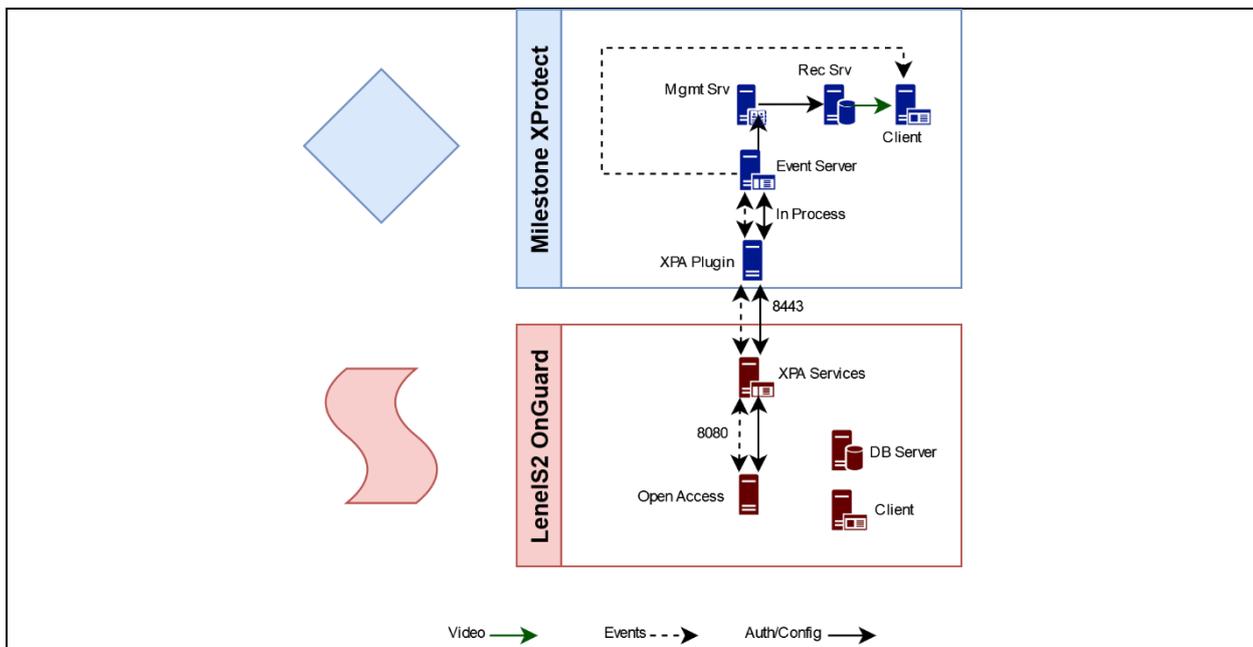
This means you can add a XProtect Management Server to OnGuard and only connect one camera from that Management Server. But, if that Management Server controls hundreds of cameras and dozens of Recording Servers, the total memory consumed on the LS Communication Server may be too much for the integration to support.

- 4- CPU utilization on the XProtect Management Server when the “Get Configuration” operation is in process.

It is recommended to set an alarm on XProtect to monitor CPU utilization higher than 70% on the Management Server. To prevent elevated CPU, it is possible to lower the number of OnGuard applications using the plugin on the affected system, increase the CPU resources of the Management Server, or spread the load across multiple connections by increasing the number of XProtect Management Servers.

## Recommended Solution Design – XProtect Access

### XProtect Access – one to one

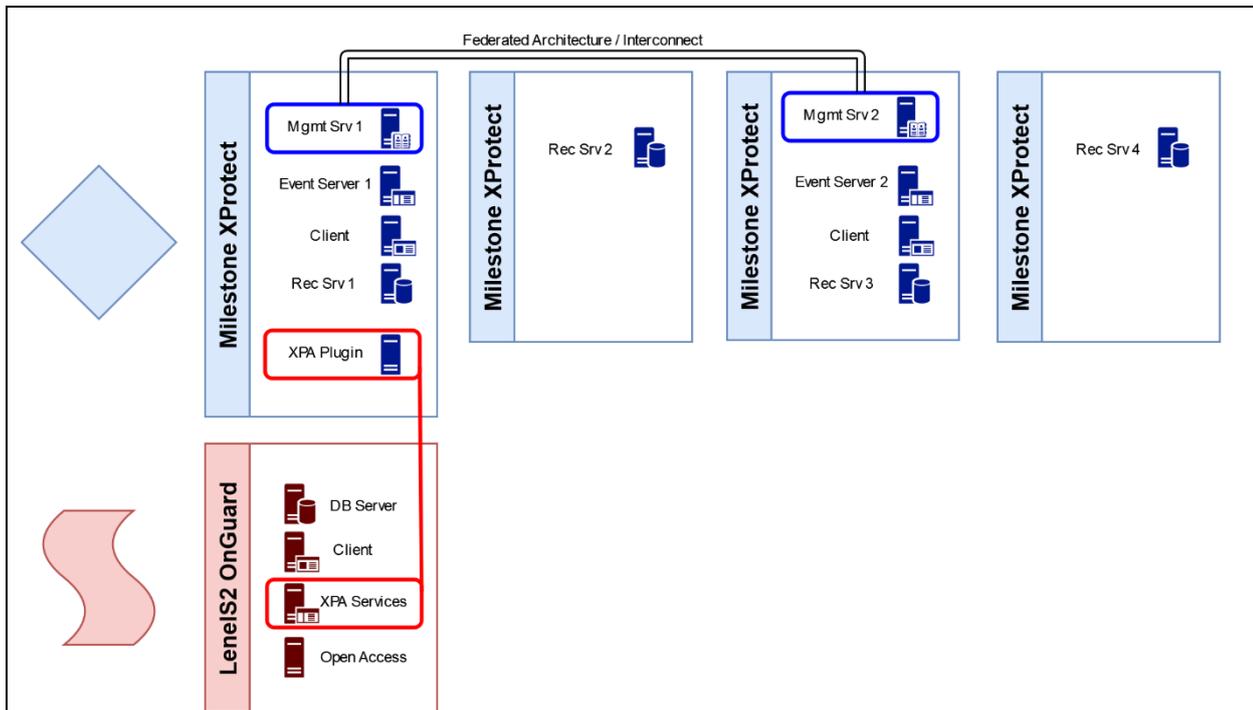


#### 1-100 cameras and 1-300 events per second

As system design scales, data flow, port, and connection details do not change - data flow is removed to focus on required components.

The XPA Plugin in the Milestone XProtect environment runs within the Event Server process. Communication and data moving between the XPA Plugin and the Event Server doesn't traverse the network. XPA Services can be installed on the OnGuard Application Server, or it can run on a stand-alone machine in the network.

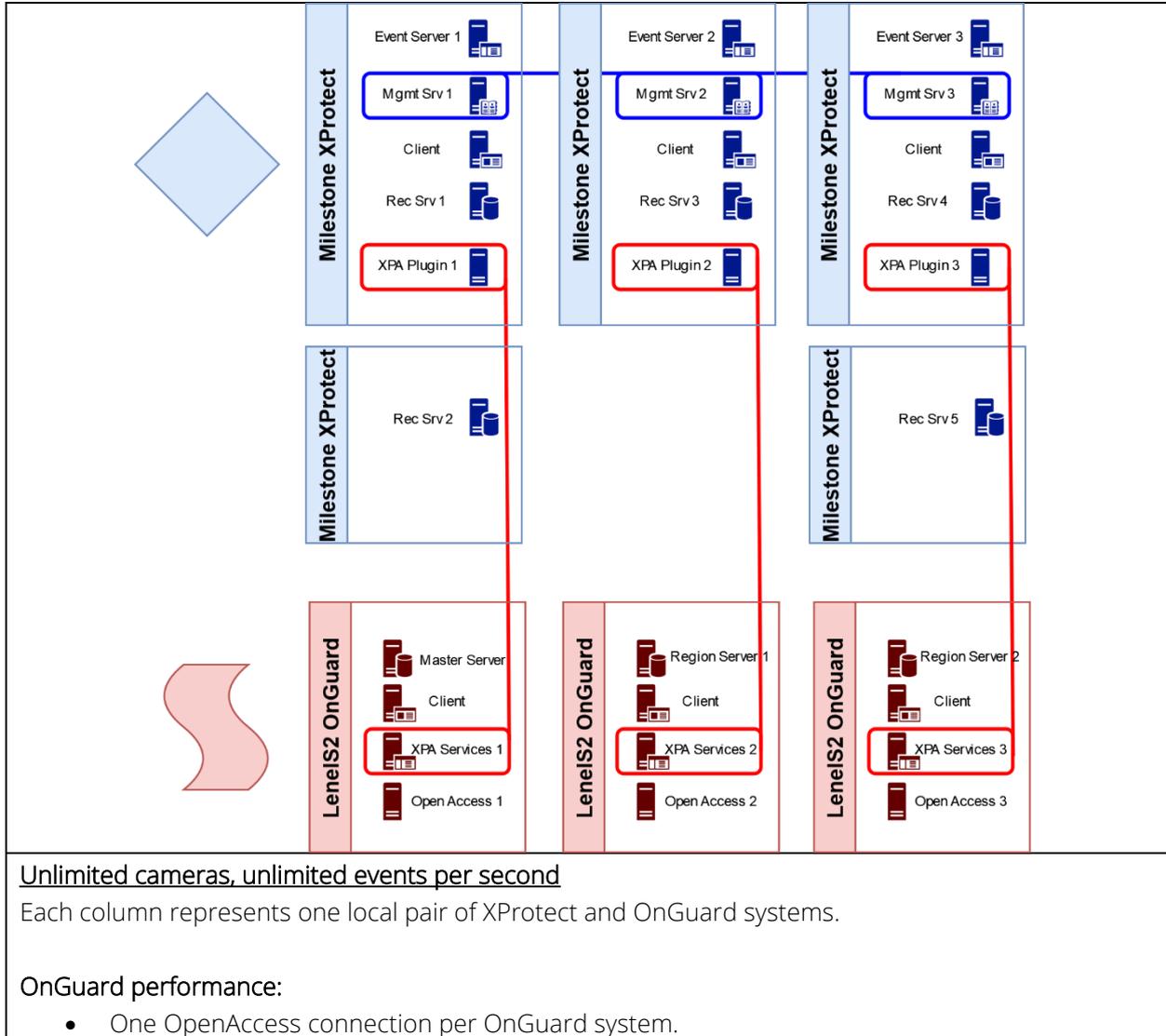
### XProtect Access – scaling up with XProtect



#### Unlimited cameras – 1-300 events per second

Single OnGuard Application Server with three extra XProtect machines: one additional Management Server with its own Event Server and Recording Server, and two extra stand-alone Recording Servers. To view all cameras in the same client session, Milestone Federated Architecture or Interconnect is required.

### XProtect Access – Enterprise



## Recommended Solution Design – OpenVideo

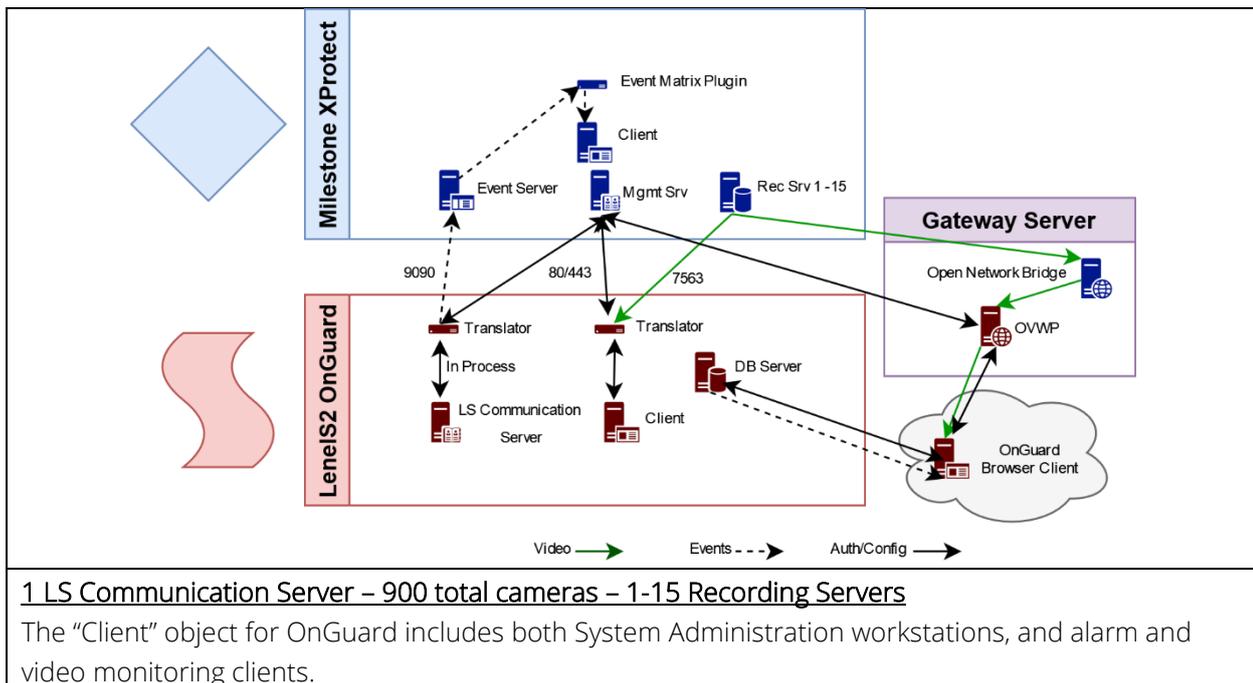
### OpenVideo – performance thresholds

Every OnGuard software component that interacts with the XProtect system runs an in-process software component - the Milestone translator .dll file. This file is used to connect to the XProtect Management Server and request information, gain access to video, and execute any other functions required for the

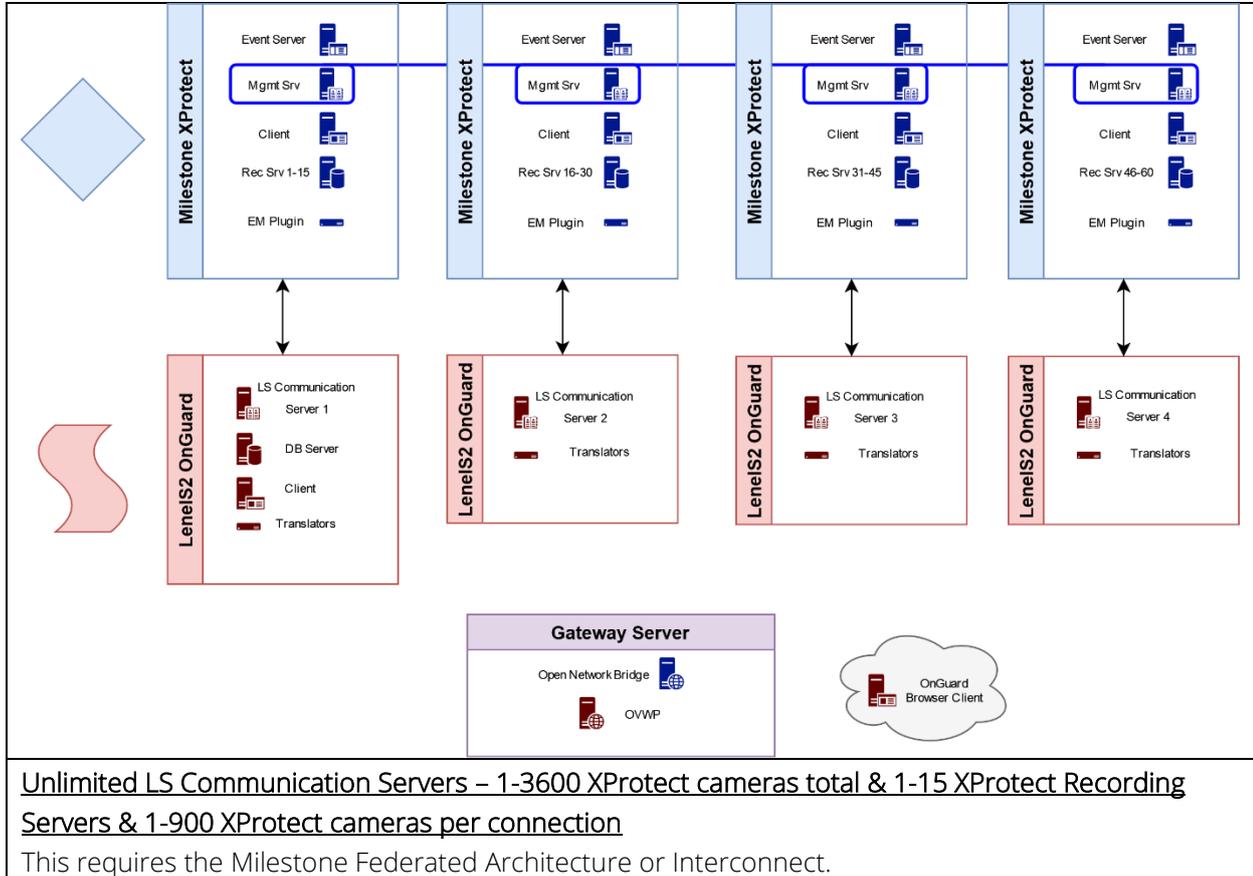
integration to work within OnGuard software. Each instance of each software component within OnGuard individually connects to XProtect. When an OnGuard component uses the translator to connect to XProtect it always requests information and part of that request is the “Get Configuration” command. This command requests the entire configuration of the XProtect system – all cameras, all devices, all Recording Servers. As the installed footprint of OnGuard components using the translator grows, the potential CPU demand on the XProtect Management Server grows proportionally. This is a directly linear relationship.

We can control the size of the XProtect system, the number of OnGuard applications using the translator, the available CPU resources on the Management Server(s), and the number of individual Management Server to LS Communication Server connections in the integrated solution. Deciding which of these variables is easiest to control in the system, will not be the same for each installation. However, it is vital to understand, that if you observe higher than expected CPU utilization on the XProtect Management Server, this may be the cause, and there are several potential solutions.

### OpenVideo – one to one



## OpenVideo – one to many



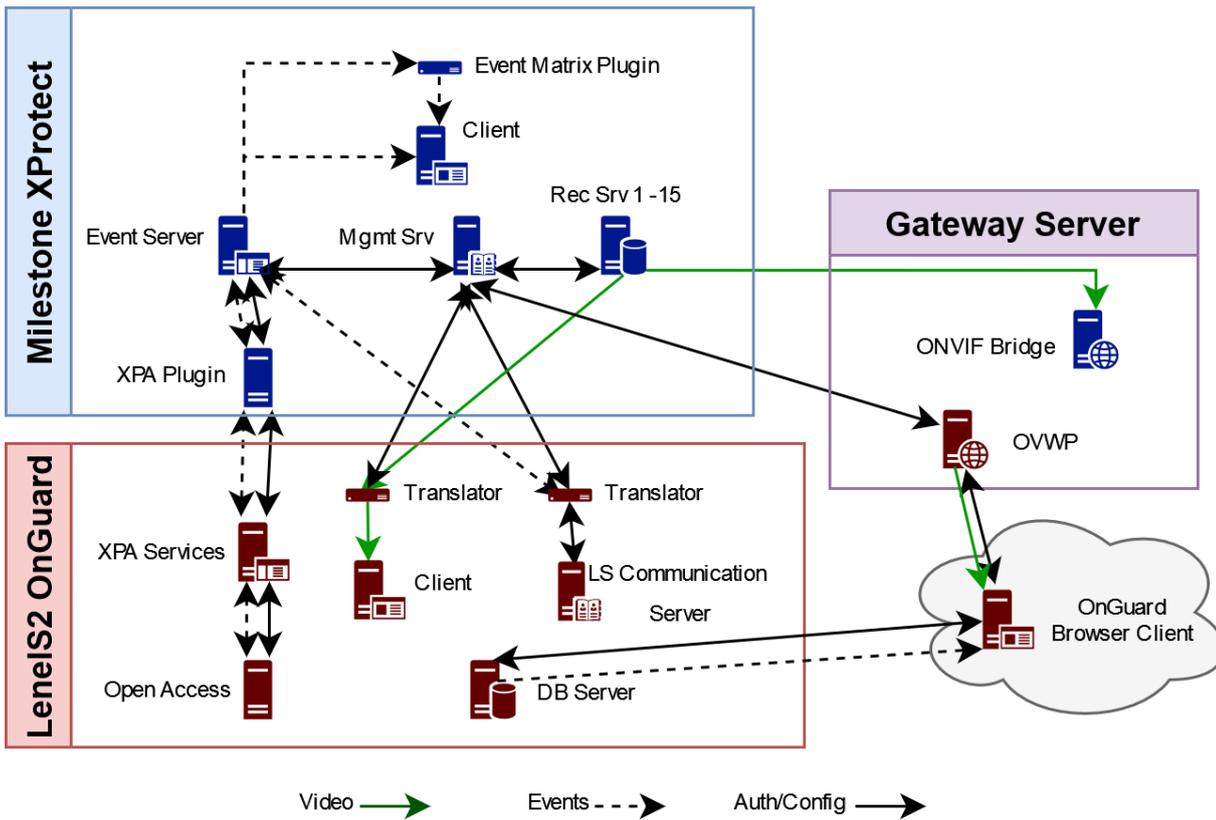
# Combined System Design - OpenVideo & XProtect Access

### Combined – performance thresholds

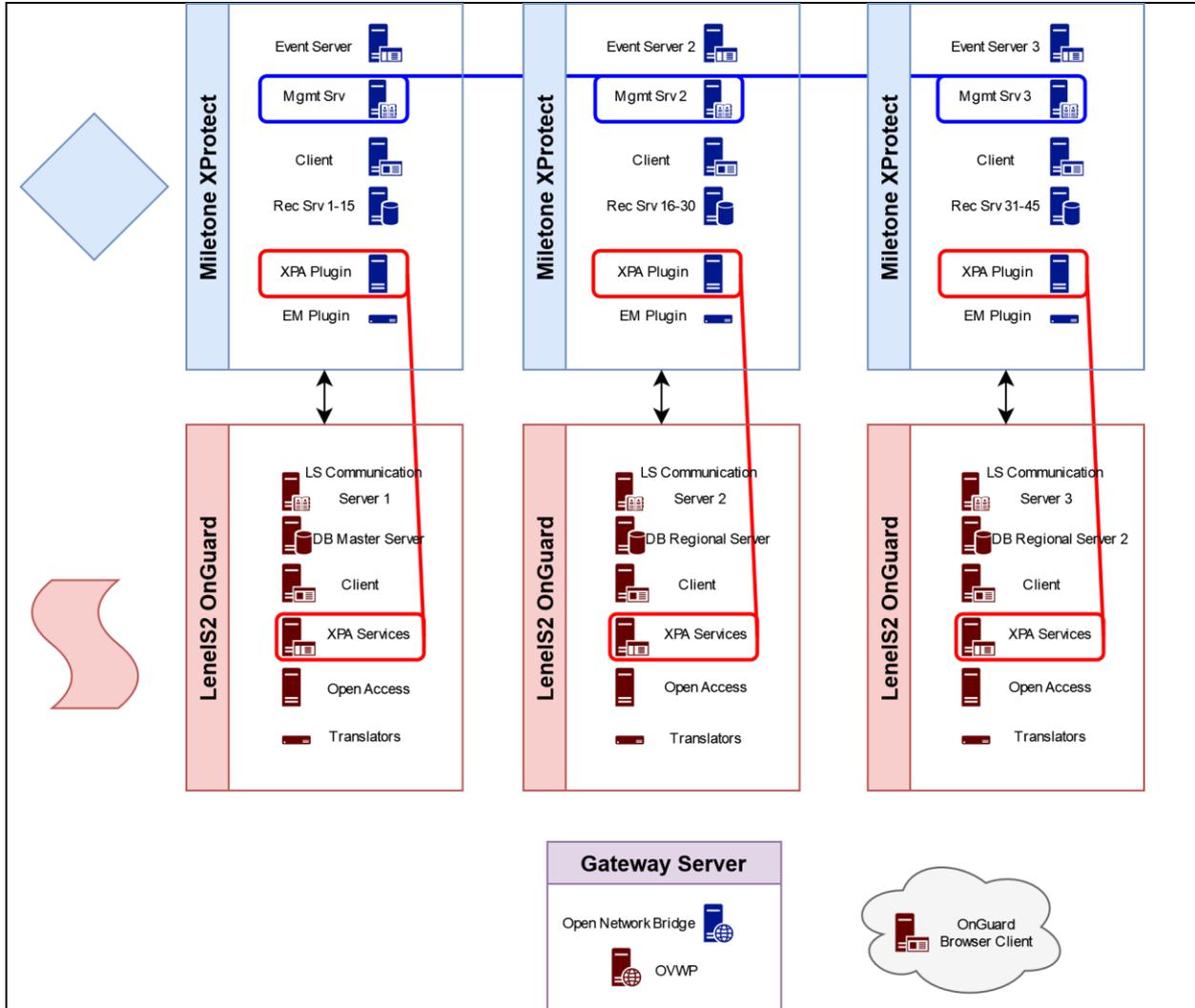
- This list applies to combined integrations with both XProtect Access and OpenVideo.
  - 1- 60 cameras or less per Recording Server.
    - 900 total cameras per XProtect Management Server.
  - 2- Limit memory consumption to 1.5 GB on an operational LS Communication Server.
    - 15 Recording Servers per LS Communication Server and XProtect Management Server.
  - 3- 100 events per second average, with discrete peaks of 300 events per second is the limitation of the Milestone Event Server.
  - 4- It is recommended that the OpenAccess connections are limited to one single XProtect Access connection.

- 5- The final limiting factor on this system is CPU utilization on the XProtect Management Server when the "Get Configuration" operation is in process connecting the XProtect system to OnGuard.

**Combined - single system component details**



### Combined – Enterprise



Unlimited cameras, unlimited Recording Servers, unlimited events per second

**Milestone performance:**

- <60 cameras per Recording Server.
- >300 events per second – system wide.
- <100-300 events per second per Event Server.
- <100% CPU during Get Configuration – on each Management Server.

**OnGuard performance:**

- <1.5GB memory on each LS Communication Server.
- Only one OpenAccess integration with XProtect Access.